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Study of Prevalence of Dengue infection in a Rurally situated Tertiary Care Medical College Hospital at Madurai, Tamilnadu

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Abstract: *A total of 821 serum samples of fever cases attended as outpatients and admitted as inpatients at Velammal Medical College Hospital, a rurally situated Medical college hospital were studied to know the prevalence of Dengue infection in this population. The study revealed that 167 out of 821 samples (20.3%) were positive for Dengue infection. Among Dengue positives, 55.6% were males and 44.4% were females and 55.09% were in the age group 0-15 yrs. Dengue was reported throughout the year but more common during November and December 2014. 68.8% were reported as primary infection and 31.2% were reported as secondary infection. NS1 Antigen detection kit detected more number of primary infections and Panbio IgG Capture ELISA detected all secondary infections.*

I. Introduction

Dengue has become known to be endemic in India for over two centuries. Dengue has been rampant in parts of Tamilnadu in the past two decades. The prevalence of Dengue vectors, the silent transmission of Dengue viruses have been detected in both rural and urban areas of Tamilnadu. Dengue has become a major public health problem with a leading cause of hospitalisation and death in children. Dengue infection is transmitted by Aedes mosquitoes and it is a rapidly emerging arboviral infection with 30 fold increase in the past 5 decades. Once considered as an urban infection, Dengue with all 4 serotypes are reported from rural areas also. This study was conducted in a rurally situated Tertiary care Medical college hospital to know the prevalence of Dengue infection in the rural areas of Madurai district during the period from May 2014 to April 2015.

II. Aims And Objectives:

This study was conducted

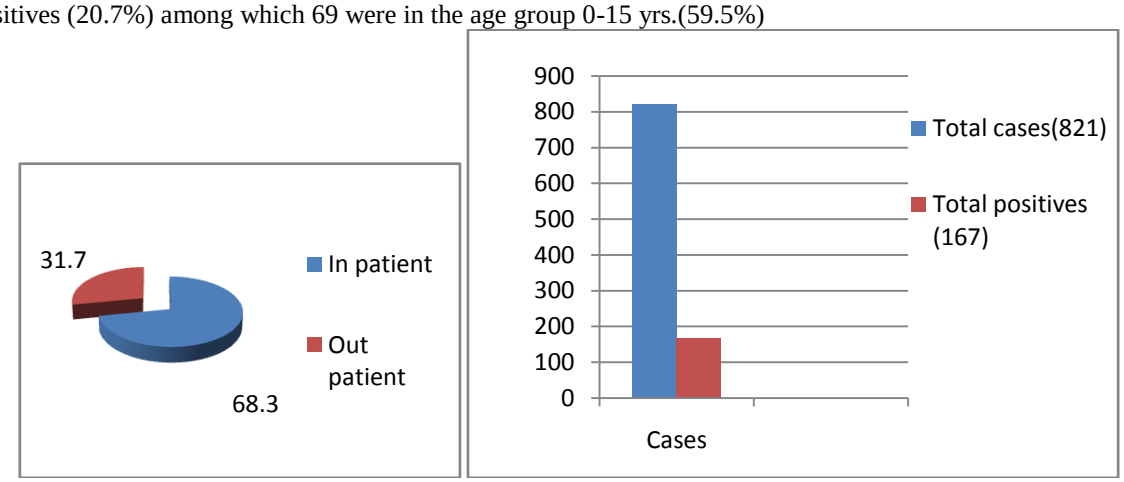
1. To know the prevalence of Dengue infection at Velammal Medical College Hospital, Anupanadi, Madurai District which is a 500 bedded hospital attached with a Medical college situated at the outskirts of Madurai catering the needs of rural population around Madurai.
2. To know the age-wise, sex-wise and month-wise distribution of Dengue infection during the year 2014-15 in these rural areas.
3. To ascertain whether the Dengue infections reported were primary infection or secondary infection
4. To find an accurate, easy and early detective method among the common available methods of diagnosis to detect the Dengue infection in these rural areas.

III. Materials And Methods:

A total of 821 serum samples were collected from fever cases attended as out-patients and admitted as in patients at Velammal Medical College Hospital during the period from May 2014 to April 2015 . The inclusion criteria of the cases were patients with fever more than 102º C with body pain, congestion of eyes, rashes, haemorrhagic spots etc and with duration ranging from 5 to 10 days. All the samples were screened for the presence of NS1 antigen, IgM antibody and IgG antibody for Dengue virus. NS1 antigen was tested by Panbio Dengue early ELISA, Dengue IgM and IgG antibodies were first screened by Dengue duo NS1Ag+Ab Combo and confirmed by Panbio IgM and IgG Capture ELISA. The positive samples were categorised as NS1 Positives, IgM Positives, NS1+IgM Positives, IgM+IgG Positives, NS1+IgM+IgG Positives, NS1+IgG Positives and IgG alone positive. The serum samples showing either NS1antigen alone or IgM antibody alone or NS1 and IgM in combination were considered as primary infection. The samples showing only IgG or IgG in combination with either NS1 or IgM were considered as secondary infection. All the relevant and suitable data were analysed and expressed in mean and percentage using computer software.

IV. Results:

Among 821 fever samples, 261 were from Outpatient Departments (31.7%) and 560 were from inpatient Departments (68.3%). Out of 821 samples screened, 167 showed positive for either Dengue NS1 antigen or Dengue IgM or Dengue IgG antibody (20.3%). Out of 560 hospitalised patients, 116 were Dengue positives (20.7%) among which 69 were in the age group 0-15 yrs.(59.5%)



This shows that Dengue cases mostly in the age group 0-15 yrs. were hospitalised.

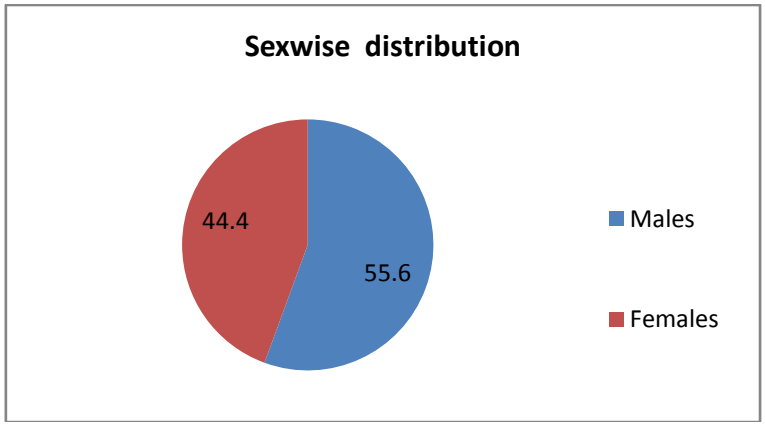
Among the 167 positive cases, 92 were in the age group 0-14 yrs . (55.09%), 46 were in the age group 15-30 yrs. (27.54%), 17 were in the age group 31-45 yrs.(10.18%), and 12 were above 45 yrs.(7.19%).This is given below:

N=167

Sl.no.	Age group	Total positives	% positives
1	0-15 yrs	92	**55.09%**
2	16-30 yrs	46	27.54%
3	31-45 yrs	17	10.18%
4	Above 45 yrs	12	7.19%

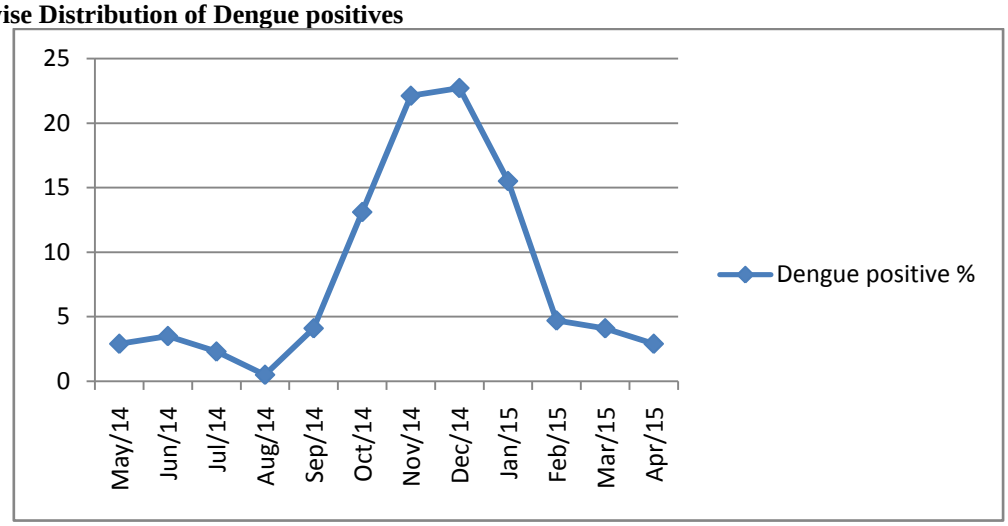
It was observed that Dengue infection was more seen in the age group 0-15 yrs.

On further analysis, it was shown that out of 167 Dengue positives, 93 were males(55.6%) and 74 were females (44.4%) proving that the Dengue infection was predominant in males than in females.

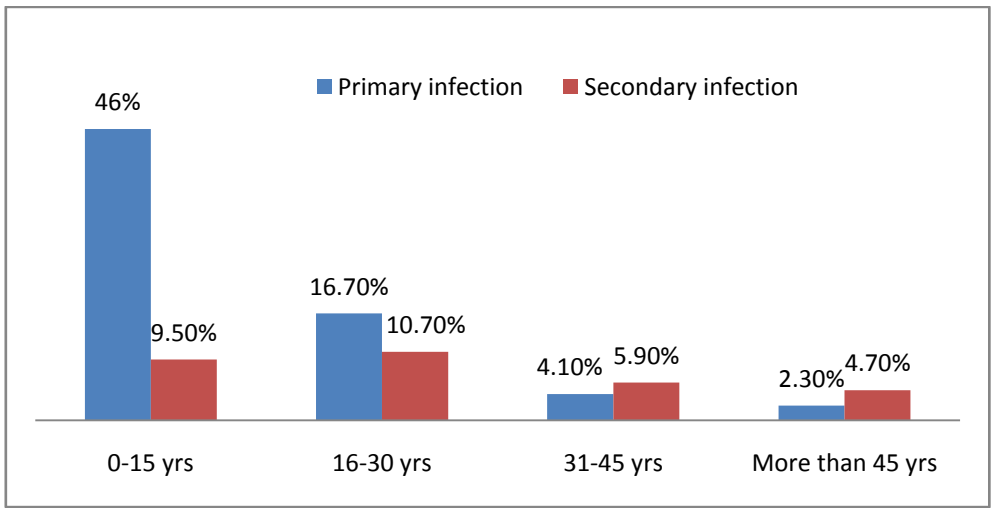


The analysis of month-wise distribution of Dengue cases proved that Dengue infection was reported throughout the year but maximum cases were reported during the months November 2014 and December 2014. From February 2015 onwards, there is a sudden decrease in the number of positive cases. This is given below:

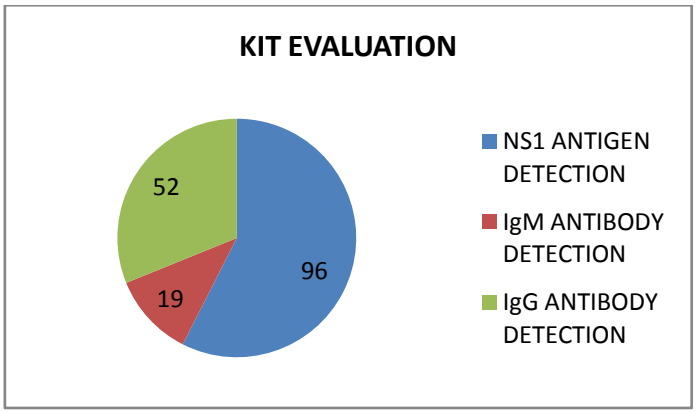
Monthwise Distribution of Dengue positives



Among the 167 Dengue positive cases, the serum of 115 cases (68.8%) showed positive for either NS1antigen alone or NS1 antigen with IgM antibody or IgM antibody alone indicating primary infection of Dengue. Similarly, 52 samples (31.2%) showed positive for either IgG antibody alone or IgG in combination with NS1/IgM indicating secondary infection of Dengue in these patients. Among 167 Dengue positives,76 primary infections were in the age group 0-15 yrs.(45.51%), 28 were in the age group16-30 yrs.(16.77%),7 were in the age group 31-45 yrs.(4.19%) and 4 were in the age group above 45 yrs(2.39%). Similarly, out of 167 Dengue positives, 16 secondary infections were in the age group 0-15 yrs.(9.58%), 18 in the age group 16-30 yrs (10.78%),10 in the age group 31-45 yrs(5.99%) and 8 above 45 yrs.(4.79%) showing that both primary and secondary infections were present in this population during 2014-15. Eventhough primary and secondary infections occur in all age groups, primary infection was common in the age group between 0-15 yrs. and secondary infection was common in 16-30 yrs.age groups. This is given below:



On evaluating the efficacy of kits, it was found that Panbio Dengue Early ELISA had detected 96 samples positive for NS1 antigen and Panbio Dengue IgM Capture ELISA detected 19 samples positive for IgM antibodies. Thus, among these two kits used for detecting primary infection, Panbio Dengue early ELISA detecting NS1 antigen was proved to be the best. Panbio Dengue IgG ELISA detected IgG antibodies in all the 52 samples of secondary infection. Hence it can be used to detect secondary infection.



V. Discussion:

This study reveals the prevalence of Dengue infection in the rural outskirts of Madurai district, Tamilnadu during the year 2014-2015 by evaluating the fever cases reported both as outpatients and inpatients in Velammal Medical College Hospital situated in such area of Madurai district. This study showed that 68.3% fever cases needed hospitalisation and 20.7% hospitalised fever cases were Dengue positives. 55.09% Dengue positives were in the age group 0-15 yrs. Similar results have been already reported in studies conducted both in north and South India. Barde PV et al[3] reported that 18% Dengue positives in rural villages at Madhya Pradesh were hospitalised. Dengue cases from rural areas prefer hospitalisation because of poor transport facilities in rural areas, to reduce their travel expenses, and for complete bed rest. As this hospital provides beds free of cost for patients, the rate of hospitalisation is slightly high. In this study, 59.5% Dengue positives were in the age group 0-15 years. The studies conducted during the years from 2005-2011 in other places of India has proved that the common age group involved were above 30 years (Jimy antony et al.[5], Smita sood et al[10], Ashwini kumar et al[2], Krunal D Mehta et al[7], M. Anuradha et al[1]). But in Tamilnadu, P.Gunasekaran et al[4] had proved in their study conducted from 2006-2008, that the age group involved was below 15 yrs. which is in concordance with this study. The involvement of lower age group in rural areas of Tamilnadu may be due to the habit of not wearing upper garments by this age group children and spending most of their times outdoors which expose them for frequent mosquito bites. Also, the environment of this rural area having plenty of coconut trees, pave way for the breeding of mosquitoes.

It was proved in this study that 55.6% Dengue positives were males and 44.4% were females. Many studies from rural areas both in North and South India show the male predominance whereas Study by P.Gunasekaran *et al*[4] from Chennai showed female predominance but this study was based on urban population. In rural areas, the males are outside their houses most of the time and their main occupation is farming. The farmers go to their fields during early mornings and late evenings for watering which is the optimum time for mosquito bites.

It was also proved in this study that the peak of Dengue cases were in the months of November and December. In 2014-15, in this area, the rain had started in the month of August and continued till October. Hence occurrence of Dengue in November and December is post monsoon which is favourable for mosquito breeding.. Similar study by Anuradha et al[1] in Tiruchi district which is nearer to this study area also showed more cases in November. But studies from many northern states (Ashwini kumar *et al*[2], Piyush Tripathy et al[10], Krunal D Mehta et al[7]) proved that more cases were reported in the month of September-October but these months were their post monsoon months. Thus, the occurrence of Dengue is common during post monsoon season irrespective of whatever the month is.

It was proved in this study that among the Dengue positives, 68.8% showed primary infection and 31.2% showed secondary infection .Most of the primary infections were in the age group 0-15 yrs. and the secondary infections in the age group 16-30 yrs. Some of the recent studies (Vazouez et al[15], Quader Ahmed Jalily et al*11*) had also shown the rise in the secondary infection in the age group 30-40 yrs. Occurrence of secondary infection in the adult age group signifies that this area is prone for Dengue endemicity and there is possibility of more number of DHF and Dengue shock syndrome in this population in future . Hence strict surveillance and preventive measures should be initiated at the earliest during pre-monsoon period itself..

The Panbio kit for detecting NS1 antigen detected 83.5% samples for primary infection and IgM antibody detection kit detected 16.5% samples for IgM antibody. All these samples were collected during 5-10 days of fever. As antigens are common in blood during this period, NS1 antigen detection kit detected more number of samples. Thus, for primary infections, NS1 Antigen kit can be recommended during early period of illness. All 52 samples showing secondary infection were proved positive by IgG. Similar study by Seok Mui Wang et al[13] has also demonstrated that the choice of kit depends on the duration of illness.

VI. Summary:

This study on the prevalence of Dengue during 2014-2015 at Velammal Medical college hospital, Madurai showed that 20.7% hospitalised fever cases were Dengue positives. 55.09 % Dengue positives were in the age group 0-15 yrs. Males were predominant. Although Dengue cases were reported throughout the year, the peak level was seen in November and December. The primary infection was common in the age group 0-15 yrs and the secondary infection in the age group 16-30 yrs. Panbio NS1 antigen detection kit detected more number of primary infections and Panbio IgG detection kit detected all the secondary infections.

VII. Conclusion:

This study on the prevalence of Dengue during 2014-2015 at Velammal Medical College revealed the occurrence of Dengue infection in this rural population throughout the year with the peak in the months of November and December. Males in the age group 0-15 yrs. were commonly involved. Both primary and secondary infections were detected. Secondary infection in children is a threat for the occurrence of Dengue haemorrhagic fever and Dengue shock syndrome in this population in future. Similarly, secondary infection in the adults is a threat for Dengue endemicity in this population. Hence strict surveillance and preventive measures are needed throughout the year in this area.

References:

[1]. Anuradha M.et al 2014 Laboratory diagnosis and incidence of Dengue virus infection: A hospital based study- Perambalur. International Journal of Biomedical research:ISSN:0976-9633(online)05(03)

[2]. Ashwini Kumar et al 2010 Clinical manifestation and trend of Dengue cases admitted in a tertiary care hospital, Udupi district, Karnataka. Indian Journal of Community medicine July:35(3) 386-390.

[3]. Barde PV, Shukla MK et al 2015 Emergence of Dengue in tribal villages of Mandla district, Madhya Pradesh, India. Indian journal of Medical research May14(5) 584-90.

[4]. Gunasekharan P. et al 2011.Dengue disease status in Chennai - a retrospective analysis. Indian journal of Medical research133 March 2011pp 322-325.

[5]. Jimy Antony, Celine TM et al.2014.A descriptive study on Dengue fever reported in a Medical College hospital. Sahel Medical Journal Volume 17 Issue 3 pages 83-86.

[6]. Kumar A., Sharma A.K.et al.2001. An outbreak of Dengue fever in rural areas of Northern India. Journal of Communicable diseases. Dec33(4) 274-281.

[7]. Krunal D.Mehta et al 2014.Profile of Dengue infection in Jamnagar city and district, West India .WHO South east Asia Journal of public health/Jan-March 2014/3(1)/72-74.

[8]. Paramasivan R, Thenmozhi V et al2006.Serological and entomological investigations of an outbreak of Dengue fever in certain rural areas of Kanyakumari district, Tamilnadu. Indian Journal of Medical Research123 May 2006, pp697-701.

[9]. Philip Samuel P., Thenmozhi V. et al:2007 A focal outbreak of Dengue fever in a rural area of Tamilnadu. Indian Journal of Medical research 125 Feb.2007-pp179-181.

[10]. Piyush Tripathy et al 2008. Descriptive epidemiology of Dengue transmission in Uttar Pradesh .Indian Paediatrics 2008:45:315-318

[11]. Quader Ahmed Jalily et al 2013.Screening for Dengue infection in clinically suspected cases in a rural teaching hospital. Journal of Microbiology and Biotechnology Research 3(2):26-29.

[12]. Smita sood et al 2013 . A hospital based serosurveillance study of Dengue infection in Jaipur (Rajasthan) India. Journal of clinical and Diagnostic research. Sep7(9)917-920.

[13]. Seok mui Wang et al August2010.Evaluation of a commercial SD Dengue virus NS1 antigen Capture Enzyme linked immunosorbent assay kit for early diagnosis of Dengue virus infection . Journal of Clinical Microbiology vol 48: no.8:2793-2797.

[14]. Turbadkar D. Et al 2012:Laboratory and Clinical profile of Dengue- A study from Mumbai.Annals of Tropical medicine and public health.Vol.5,issue 1/page20-23.

[15]. Vazouez et al 2005 Serological markers of Dengue 3 primary and secondary infections. Journal of clinical virology. June:33(2):132-7E pub 2004 Dec 18.